SepEd2
User Guide

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Introduction

SepEd2 lets you edit the colour correction (separation) curves used by Computer Concepts products to convert RGB colours to CMYK. This application is not intended for use by a novice and you require a basic knowledge of Acorn computers. For example, we expect you to know how to look inside applications and other directories. This manual therefore omits step-by-step details of basic operations.

A warning note...

Generating separation curves can be time consuming. We do not know of any theoretical basis for determining suitable curves and so the only way is experimental. (If you know of any published theory, please let us know.) You generate the curves, print them, check the results, make any adjustments and try again.

We suggest that you always edit a copy of a set of curves. This lets you restore the original curves if your changes are unsuccessful.

We recommend using a colour image with a wide range of colours and tints as a test document.

SepEd2 is supplied 'as is' and Computer Concepts cannot offer technical support on it. Nor can we offer advice on suitable sets of curves except those supplied with our products. These curves are the result of lengthy tests and represent the best results we have been able to achieve. However, if you produce curves that give better results, please let us know. This particularly applies to Hewlett Packard and Epson printers.

Why colour correction curves are required

The monitor screen displays colours by **emitting** combinations of Red, Green and Blue. You can define colours by specifying the proportions of these primary colours using the RGB colour model. (The HSV colour model is similar.)

You perceive the colour when printed by light reflected from the four inks on the paper. These inks are Black. Cyan, Magenta and Yellow. (Black is referred to as the Key colour and the colour model as CMYK.)

It follows that before printing, colours defined in RGB or HSV must be converted to CMYK. In theory, this is simple:

Red	= Magenta + Yellow
Green	= Cyan + Yellow
Blue	= Cyan + Magenta
Black/Grey	= Cyan + Magenta + Yellow.

In practice, this simple translation is inadequate:

- The inks used in the printer are not pure colours. Magenta dominates slightly and so, for example, blues appear slightly purple. Similarly, black and greys appear muddy.
- Black text printed from purely CMY appears slightly fuzzy.
- Printing large areas of dark grey or black can swamp the paper with excessive amounts of ink. This causes the paper to crinkle and increases drying times.

To improve blacks and greys, black ink replaces a proportion of the other inks. The final colour normally retains some CMY element to avoid a sharp colour transition to black or grey.

Correction curves therefore:

- reduce the proportion of magenta in the final colour and correct any other colour imbalance,
- control the amount of the CMY inks removed and the amount of black substituted.

Please note:

Separation curves only affect colours specified in RGB or HSV. Colours specified in CMYK are always passed to the printer without modification.

The correction process

This is a four stage process:

Step 1: Convert the colour to the equivalent CMY colours. Record the smallest colour value (the *minimum*). For example, if the colour is 20% C 33% M and 10% Y, the smallest colour value is 10%. Which colour is the smallest is irrelevant.

Step 2: Look up *minimum* on the Black Generation Curve. This is the final value for black.

Step 3: Look up *minimum* on the Under-Colour Removal (UCR) curve. This gives the value for *UCR*.

Subtract *UCR* from each of the CMY values.

Step 4: Look up the new CMY values on their respective curves. This gives the final CMY values.

Where to find and store the curves

Each set of curves is held in a separate directory.

In ArtWorks, Style, Publisher and Publisher Plus

The curve directories are in *Resources.cmyk* inside the application.

Style uses the curve directory called *Default*. The other applications provide a user interface to select between different directories.

In TurboDriver

The curve directories are in *!System.!CCShared.cmyk*.

The *!Contents* file

When SepEd2 saves a set of curves it creates a dummy file called *!Contents*. You can then edit this file to show the name of the curves, a version number and date, for example:

Canon BJC600/800
0.01
15/12/93

The name appears in the table menus for ArtWorks and Publisher.

Black text in Impression

This applies to Impression Style, Publisher and Publisher Plus.

Text defined as RGB black is converted directly to 0% CMY/ 100% K by Impression and is not passed through the separation curves.

What's on the disc:

SepEd2 – the curve editing application.
Curves – sample separation curves.
Blobs – some sample sprites for showing curve control points. Their use is described later in *Display options*.
Pictures – sample ArtWorks files and sprites showing a range of colours.

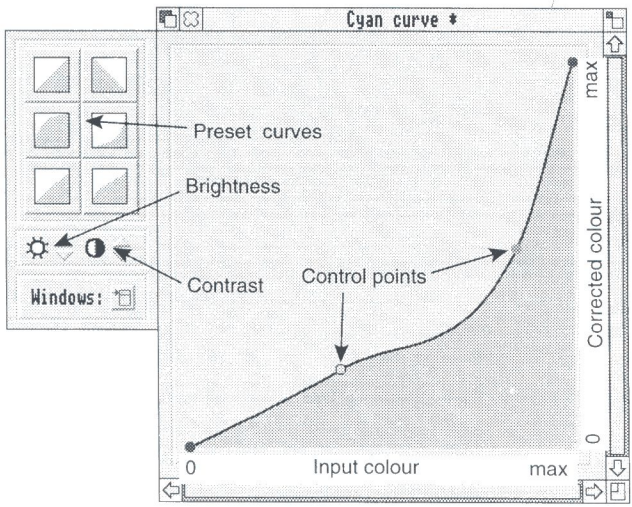
2 Using SepEd2

You can either:

- click on the SepEd2 icon on the icon bar to start a new set of curves,
- or, more usually, drop a directory file icon onto the SepEd2 icon on the icon bar to edit an existing set of curves.

Dependent on *Options → Open all curves* on the Icon Bar Menu, this opens a window showing the cyan curve or all five windows.

The editing window



Opening and closing windows on the other curves

Either

- choose from *Windows* on the Icon Bar Menu,
- or click on the windows menu icon on the editing window.

If a name is ticked, clicking on it closes the window.

If a name is unticked, clicking on it opens the window.

Clicking on the SepEd2 icon on the icon bar opens or tops the next curve windows in the sequence: *Cyan, Magenta, Yellow, Black Removal, Black Generation*.

Scaling your view

You can increase or decrease the scale of the editing window using *Utilities → Scale*. Minimum scale is 25%; maximum 1,000%. All you change is your view onto the curve; the curve itself does not change.

Set *Scale all* in the Scale dialogue box to scale all the windows. Reset *Scale all* to scale only the current window.

Editing the curves

Changing the shape of the curve using control points is described in detail in a later section.

Brightness

This increases or decreases the amount of ink printed. Increasing the ink makes the printed image darker (because less paper shows through the ink).

Click on the bump icons to make small changes. Click on the icon itself for larger changes. This control does not affect locked control points (described later).

Contrast

This controls the contrast between the lightest and darkest parts of the curve. Its operation is similar to Brightness (described above).

Preset curves

Several preset curves are shown to the side of the editing window. The same presets are accessible using *Utilities → Presets*. Selecting a preset overwrites the existing curve shown in the window.

Flipping the curve

Utilities → Flip flips the current curve around either the horizontal or vertical axis.

Reloading the last saved version

Reset all on the Icon Bar Menu discards any changes and reloads the curves from the file on disc.

Control points

Clicking on a control point selects it and changes its colour to orange. All editing actions apply only to the selected point.

Adding a new control point

Click on the edge of the curve to add a new point.

Alternatively click away from the edge to create a new point and move the nearest part of the curve to it.

Moving a control point

You cannot move locked points – see *Locking a control point*.

Either:

- use the mouse to drag the point.
- or double-click on the point. This displays the Edit dialogue box showing the point's X-Y co-ordinates relative to the bottom left corner of the curve. The range of values is 0–255. Edit these values and click *OK*.
- or *Edit → Edit point* displays the Edit dialogue box.

Deleting a control point

You cannot delete locked points – see *Locking a control point.*

Either:

- use *Edit → Delete point*,
- or Adjust-click on a point,
- or move the control point over another point. You can disable this option by deselecting *Options → Delete drag* on the Icon Bar Menu. This is useful when moving closely spaced points.

Locking a control point

Locking a control point stops you accidentally dragging or deleting it. By default the start and end points are locked.

The pointer changes to a key shape when over a locked control point.

Use *Edit → Lock point* to lock or unlock the selected point.

Copying a curve

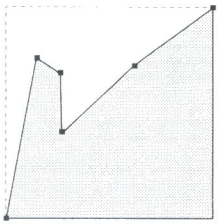
You can copy a curve from one set of separations to another. This is a two stage process:

1. Copy the curve to the clipboard using *Edit → Copy curve.* You can open a window onto the clipboard and edit the curve if required.
2. Drop a directory file icon onto the SepEd2 icon on the icon bar to load the other set of curves. Open the required window. You can then copy the curve into that window using *Edit → Paste curve.*

   The curve remains on the clipboard and you can paste it into other windows if required.

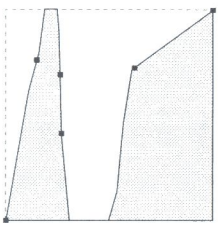
The shape of the curve

SepEd2 provides three ways of joining control points. The curves used in this example are greatly exaggerated for illustration.

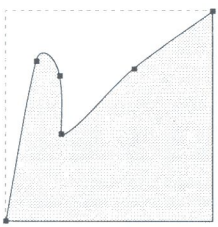


Style → Straight line

As the name suggests, control points are joined by straight lines.



Style → Bspline curve
This can create large changes of value.



Style → Catmull-Rom
This produces more gradual changes than B-splines.

Saving

SepEd2 generates two sets of data:

- Curves – you can later reload these into SepEd2 if further editing is needed. Applications cannot use the curves to separate colours; tables derived from the curves are needed.
- Tables – SepEd2 generates the tables from the curves. Tables are used by applications when separating. SepEd2 cannot recreate the original curves from the tables.

Save options provided by SepEd2 are:

- Save both the curves and tables (*File → Save*).
- Save only the tables (*File → Save just tables*). Remember SepEd2 cannot recreate the curves from the tables. Unless you also store the curves and tables elsewhere, you cannot make further edits.
- Save the current curve (*File → Save this curve*).

If you save the curves back to their original directory, *Options → Backup saved curves* renames the existing curves before saving the new curves.

Options → Old file format on the Icon Bar Menu controls the saved file format. Normally this option is off and files are saved in SepEd2 format. If the option is on, files are saved in SepEd1 format. This option is provided only for backward compatibility and we recommend always saving in SepEd2 format.

Display options

SepEd2 includes several options for displaying the data on screen. These options only affect how the data is displayed – they do not alter the data itself.

The display options are set using the *Style* submenu. If *Options → Change all curves* is selected on the Icon Bar Menu, any display change applies to all curves. If *Change all curves* is deselected, changes apply only to the current curve.

Fill the curve

Style → Filled

With this option selected, areas under the curve are colour filled. This improves the appearance but slightly slows down screen redraws.

Control points

You can display the control points as

- open or closed (*Style → Blobs → Hollow*). Hollow points let you see the actual position on the curve better but make the points less noticeable. *Hollow* has no effect on sprites (see below).

and as

- circles (*Style → Blobs → Circles*),
- rectangles (*Style → Blobs → Rectangles*)
- or a sprite (*Style → Blobs → Sprite*). To use a sprite, drop a sprite file onto the SepEd2 editing window. This automatically selects *Sprite* and replaces the current shape with sprites. The sprites must be 16 colour or less.

  The sprite file can contain one sprite for all types of point or three sprites representing, in order, Normal, Selected, and Locked points.

  The directory *Blobs* contains sample sprites.

You can change the size of the control points using *Style → Blobs → Size*. **0** makes the blobs invisible; **10** makes the blobs large.

Options → Colour points on the Icon Bar Menu controls the fill colour of control points.

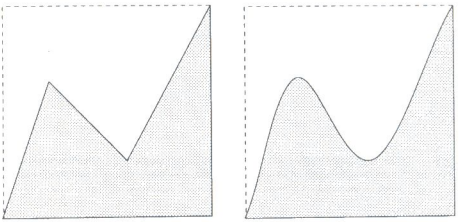
- *Colour points* off:
  the selected point is orange,
  other points are black filled.
- *Colour points* on:
  the selected point is orange,
  locked points are dark blue,
  other points are shown in the separation colour.

Lines

Style → Lines → Use draw uses a variable-width line to show the curve. The width of the line is set by *Style → Lines → Width*. (**0** is an invisible line; **10** a thick line.) If Computer Concepts' GDraw and DitherExtend modules are in memory, the line is shown anti-aliased which gives smoother curves.

If *Use draw* is not selected, a thin line marks the edge of the curve.

Style → *Lines* → *Accuracy* controls how closely the displayed curve matches the true curve. High values closely match the displayed and actual curves but take longer to redraw on screen. This value only affects the displayed curve. The tables are always generated using maximum accuracy.



The same curve shown with accuracy ***0*** *(left) and* ***10*** *(right)*